

## CLAIMS

What is claimed is:

- 5     1. In a transceiver, a method for authenticating operation of the transceiver with a control station within a wireless remote identification system, the method comprising:
- receiving transceiver configuration information including a network address and transceiver authentication credentials,
- receiving an authentication request from a control station within the remote
- 10    identification system;
- applying authentication processing to request information within the authentication request in conjunction with the transceiver authentication credentials to produce an authentication response; and
- transmitting the authentication response to the control station to allow the control
- 15    station to determine if the transceiver is authorized to communicate within the remote identification system.
2. The method of claim 1 wherein receiving transceiver configuration information including a network address and transceiver authentication credentials comprises:
- 20    performing address assignment processing to receive the network address;
- receiving transceiver authentication credentials including receiving:
- i) a transceiver identification code uniquely assigned to the transceiver;
- and
- ii) a transceiver instruction set containing a set of authentication values
- 25    and corresponding authentication instructions.
3. The method of claim 2 wherein receiving transceiver configuration information comprises:
- periodically receiving replacement transceiver authentication credentials to
- 30    replace the transceiver authentication credentials formerly received by the transceiver.

4. The method of claim 3 wherein the request information within the authentication request includes:

- i) an request authentication result; and
- 5 ii) a request data value;

wherein applying authentication processing to request information within the authentication request in conjunction with the transceiver authentication credentials to produce an authentication response comprises:

- 10 identifying an authentication instruction that matches the request authentication result; and
- applying the authentication instruction that matches the request authentication result to the request data value from the authentication request to produce the authentication response.

15 5. The method of claim 4 wherein identifying an authentication instruction that matches the request authentication result comprises:

applying an authentication function to authentication values in the set of authentication values within the transceiver authentication credentials to produce corresponding transceiver authentication results; and

- 20 for each transceiver authentication result produced, determining if the transceiver authentication result matches the request authentication result for that authentication value, and if the transceiver authentication result matches the request authentication result for that authentication value, performing the operation applying the authentication instruction to produce the authentication response.

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6. The method of claim 5 wherein the request authentication result is a hash value result produced from a hash function within the control station and wherein the authentication function is an equivalent hash function within the transceiver and wherein the request authentication result is calculated by the control station using the hash function on a copy

of the authentication values in the set of authentication values within the transceiver authentication credentials that is programmed into the control station.

5 7. The method of claim 5 wherein applying the authentication instruction that matches the request authentication result to the request data value from the authentication request to produce the authentication response comprises:

applying the authentication instruction to the request data value in conjunction with the transceiver identification code to obtain the authentication response.

10 8. The method of claim 1 comprising repeating receiving an authentication request, applying authentication processing and transmitting the authentication response until at least one of:

i) an authentication acknowledgement is received from the control station indicating that the transceiver was successfully authenticated; and

15 ii) a number of repeated attempts to authenticate the transceiver each fail.

9. The method of claim 8 comprising repeating the operations of receiving an authentication request, applying authentication processing and transmitting the authentication response and upon each repeated iteration of such operations, the authentication request specifies at least one of:

20 i) a different request authentication result for use by the transceiver to select an authentication instruction; and

ii) a different request data value for use by the transceiver during application of the selected authentication instruction.

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10. The method of claim 1 wherein the transceiver is an RFID transceiver and wherein the control station operates an RFID management application.

11. The method of claim 1 wherein receiving transceiver configuration information comprises:

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performing an automatic download operation to receive the transceiver authentication credentials during trusted time period of operation of the transceiver.

12. The method of claim 4 wherein the identified authentication instruction is at least one  
5 of a roll forward and a roll back instruction and wherein the request data value indicates an amount by which to roll the instruction set and wherein applying the authentication instruction that matches the request authentication result to the request data value from the authentication request to produce the authentication response comprises:

10 shifting a relationship position of the authentication instruction relative to the transceiver authentication values in the authentication credentials by an amount specified by the request data value, such that each transceiver authentication value in the authentication credentials corresponds to a different authentication instruction than prior to shifting the relationship position of the authentication instruction.

15 13. In a control station for management of transceivers, a method for authenticating operation of the transceiver with the control station within a wireless remote identification system, the method comprising:

providing transceiver configuration information including a network address and transceiver authentication credentials to a transceiver;

20 providing an authentication request from the control station within the remote identification system to the transceiver, the authentication request containing a request authentication result and a request data value;

receiving an authentication response from the transceiver, the authentication response containing an authentication response answer to the authentication request; and

25 determining if the authentication response answer is valid by applying authentication processing to the authentication response answer within the authentication response in conjunction with the transceiver authentication credentials, and if the authentication response answer is valid, transmitting an authentication success message to the transceiver.

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14. The method of claim 13 wherein providing an authentication request from the control station within the remote identification system to the transceiver, the authentication request containing a request authentication result and a request data value comprises:

5       selecting a transceiver authentication value from the transceiver authentication credentials; and

      applying an authentication function to the transceiver authentication value to produce the request authentication result for use in the authentication request.

15. The method of claim 14 wherein determining if the authentication response answer is valid comprises:

10       applying an authentication instruction corresponding to the selected transceiver authentication value to the request data value in conjunction with a transceiver identification code of the transceiver to which the authentication request was provided in order to produce a control station response; and

15       comparing the control station response to the authentication response answer within the authentication response to determine if they are equivalent, and if they are equivalent, indicating that the authentication response answer is valid.

16. A transceiver comprising:

20       a memory;  
      a processor;  
      a communications interface;  
      an interconnection mechanism coupling the memory, the processor, and the communications interface, the memory encoded with an authentication process that when  
25       executed by the processor, causes the transceiver authenticate operation of the transceiver with a control station within a wireless remote identification system by causing the transceiver to perform the operations of:

      receiving, via the communications interface, transceiver configuration information including a network address and transceiver authentication credentials,

receiving, via the communications interface, an authentication request from a control station within the remote identification system;

applying authentication processing to request information within the authentication request in conjunction with the transceiver authentication credentials to  
5 produce an authentication response; and

transmitting, via the communications interface, the authentication response to the control station to allow the control station to determine if the transceiver is authorized to communicate within the remote identification system.

10 17. The transceiver of claim 16 wherein when the transceiver performs the operation of receiving transceiver configuration information including a network address and transceiver authentication credentials, the transceiver performs the operations of:

performing address assignment processing to receive the network address;

receiving transceiver authentication credentials including receiving:

15 i) a transceiver identification code uniquely assigned to the transceiver;  
and

ii) a transceiver instruction set containing a set of authentication values and corresponding authentication instructions.

20 18. The transceiver of claim 17 wherein when the transceiver performs the operation of receiving transceiver configuration information, the transceiver performs the operation of:

periodically receiving replacement transceiver authentication credentials to replace the transceiver authentication credentials formerly received by the transceiver.

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19. The transceiver of claim 18 wherein the request information within the authentication request includes:

i) an request authentication result; and

ii) a request data value;

wherein when the transceiver performs the operation of applying authentication processing to request information within the authentication request in conjunction with the transceiver authentication credentials to produce an authentication response, the transceiver performs the operations of:

5 identifying an authentication instruction that matches the request authentication result; and

applying the authentication instruction that matches the request authentication result to the request data value from the authentication request to produce the authentication response.

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20. The transceiver of claim 19 wherein when the transceiver performs the operation of identifying an authentication instruction that matches the request authentication result, the transceiver performs the operations of:

15 applying an authentication function to authentication values in the set of authentication values within the transceiver authentication credentials to produce corresponding transceiver authentication results; and

for each transceiver authentication result produced, determining if the transceiver authentication result matches the request authentication result for that authentication value, and if the transceiver authentication result matches the request authentication result  
20 for that authentication value, performing the operation applying the authentication instruction to produce the authentication response.

21. The transceiver of claim 20 wherein the request authentication result is a hash value result produced from a hash function within the control station and wherein the  
25 authentication function is an equivalent hash function within the transceiver and wherein the request authentication result is calculated by the control station using the hash function on a copy of the authentication values in the set of authentication values within the transceiver authentication credentials that is programmed into the control station.

22. The transceiver of claim 20 wherein when the transceiver performs the operation of applying the authentication instruction that matches the request authentication result to the request data value from the authentication request to produce the authentication response, the transceiver performs the operation of:

- 5           applying the authentication instruction to the request data value in conjunction with the transceiver identification code to obtain the authentication response.

23. The transceiver of claim 16 wherein the transceiver performs the operation of repeating receiving an authentication request, applying authentication processing and  
10           transmitting the authentication response until at least one of:

- i) an authentication acknowledgement is received from the control station indicating that the transceiver was successfully authenticated; and
- ii) a number of repeated attempts to authenticate the transceiver each fail.

15   24. The transceiver of claim 23 wherein the transceiver performs the operation of repeating the operations of receiving an authentication request, applying authentication processing and transmitting the authentication response and upon each repeated iteration of such operations, the authentication request specifies at least one of:

- 20           i) a different request authentication result for use by the transceiver to select an authentication instruction; and
- ii) a different request data value for use by the transceiver during application of the selected authentication instruction.

25   25. The transceiver of claim 16 wherein the transceiver is an RFID transceiver and wherein the control station operates an RFID management application.

26. The transceiver of claim 16 wherein when the transceiver performs the operation of receiving transceiver configuration information, the transceiver performs the operation of:



performing an automatic download operation to receive the transceiver authentication credentials during trusted time period of operation of the transceiver.

27. The transceiver of claim 19 wherein the identified authentication instruction is at least one of a roll forward and a roll back instruction and wherein the request data value indicates an amount by which to roll the instruction set and wherein when the transceiver performs the operation of applying the authentication instruction that matches the request authentication result to the request data value from the authentication request to produce the authentication response, the transceiver performs the operation of:

shifting a relationship position of the authentication instruction relative to the transceiver authentication values in the authentication credentials by an amount specified by the request data value, such that each transceiver authentication value in the authentication credentials corresponds to a different authentication instruction than prior to shifting the relationship position of the authentication instruction.

28. A control station comprising:

a memory;

a processor;

a communications interface;

an interconnection mechanism coupling the memory, the processor, and the communications interface, the memory encoded with an authentication process that when executed by the processor, causes the control station to authenticate operation of a transceiver with the control station within a wireless remote identification system by causing the control station to perform the operations of:

providing, via the communications interface, transceiver configuration information including a network address and transceiver authentication credentials to a transceiver;

providing, via the communications interface, an authentication request from the control station within the remote identification system to the transceiver, the authentication request containing a request authentication result and a request data value;

receiving, via the communications interface, an authentication response from the transceiver, the authentication response containing an authentication response answer to the authentication request; and

determining if the authentication response answer is valid by applying authentication processing to the authentication response answer within the authentication response in conjunction with the transceiver authentication credentials, and if the authentication response answer is valid, transmitting, via the communications interface, an authentication success message to the transceiver.

29. The control station of claim 28 wherein when the control station performs the operation of providing an authentication request from the control station within the remote identification system to the transceiver, the authentication request containing a request authentication result and a request data value, the control station performs the operations of:

selecting a transceiver authentication value from the transceiver authentication credentials; and

applying an authentication function to the transceiver authentication value to produce the request authentication result for use in the authentication request.

30. The control station of claim 29 wherein when the control station performs the operation of determining if the authentication response answer is valid, the control station performs the operations of:

applying an authentication instruction corresponding to the selected transceiver authentication value to the request data value in conjunction with a transceiver

identification code of the transceiver to which the authentication request was provided in order to produce a control station response; and

comparing the control station response to the authentication response answer within the authentication response to determine if they are equivalent, and if they are equivalent, indicating that the authentication response answer is valid.

31. A computer program product having a computer-readable medium including computer program logic encoded thereon that, when performed in a transceiver having a coupling to a communications interface provides a method for authenticating the transceiver with a control station in a network by performing the operations of:

- 5       receiving, via the communications interface, transceiver configuration information including a network address and transceiver authentication credentials,
- receiving, via the communications interface, an authentication request from a control station within the remote identification system;
- applying authentication processing to request information within the
- 10       authentication request in conjunction with the transceiver authentication credentials to produce an authentication response; and
- transmitting, via the communications interface, the authentication response to the control station to allow the control station to determine if the transceiver is authorized to communicate within the remote identification system.

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32. A computer program product having a computer-readable medium including computer program logic encoded thereon that, when performed in a control station having a coupling to a communications interface provides a method for authenticating a transceiver with the control station by performing the operations of:

- 20       providing, via the communications interface, transceiver configuration information including a network address and transceiver authentication credentials to a transceiver;
- providing, via the communications interface, an authentication request from the control station within the remote identification system to the transceiver, the
- 25       authentication request containing a request authentication result and a request data value;
- receiving, via the communications interface, an authentication response from the transceiver, the authentication response containing an authentication response answer to the authentication request; and
- determining if the authentication response answer is valid by applying
- 30       authentication processing to the authentication response answer within the authentication

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response in conjunction with the transceiver authentication credentials, and if the authentication response answer is valid, transmitting, via the communications interface, an authentication success message to the transceiver.